

Speakers' profiles



*Courtesy of AIST,
Japan*

Hiroyuki Yoshikawa,
President, National Institute of Advanced Industrial Science and Technology, (AIST) Japan

Hiroyuki Yoshikawa established his early reputation as an expert in engineering science and went on to become President of his *Alma Mater*, the University of Tokyo. Between 1998- 2001 he also presided over the University of the Air, a Japanese initiative that makes use of cutting edge technology to provide members from all sectors of society with lifelong learning opportunities. He has gained international renown for spearheading institutional efforts to promote freedom of scientific information access and has also earned global respect as a crusader for the removal of obstacles to technological advance in developing and transition countries. Hiroyuki Yoshikawa's capacities as scientist and modern humanist earned him election to the Presidencies of the Science Council of Japan (1997-2003) and the International Council for Science (1999-2002), tasks that he carried out with distinction. As president of AIST whose institutional motto is "Full Research in Society", for Society, he continues to champion the principle of scientific responsibility towards humankind as a whole.



*Courtesy of Imperial
College, London*

Julia Higgins,
Professor of Polymer Science, Imperial College, London; Vice-President and Foreign Secretary of the Royal Society of Great Britain.

Julia Higgins obtained her doctorate in physical chemistry at Oxford in 1968. She has been on the academic staff of Imperial College since 1976 and was appointed to a professorship in 1989. Her research involves the use of neutron scattering to study the behaviour of complex materials in terms of their molecular structure, organisation and motion. She has chaired the British Engineering and Physical Sciences Research Council and the British Association for the Advancement of Science and is a foreign member of the US National Academy of Engineering. Julia is not only a leader in her own field, also a vociferous advocate of the need for continuous dialogue between science as an enterprise and society as a larger whole. She has pioneered exploration of the responsibilities of being a scientist in the modern world and has also been instrumental in bringing consideration of gender issues in European science to the political forefront. Among the numerous distinctions Julia Higgins has received in recognition of her contributions as a public ambassador for Science, she became a Dame of the British Empire in 2001, and a Chevalier de la Legion d'Honneur in 2004. In October 2006 she will take up the post of Principal of the Engineering Faculty at Imperial College, London. Her remarkable scientific credentials and her long-standing involvement with humanist issues made her the outstanding choice to become the first "Scientist in Residence" of the WKD "Foundation" and the Moderator of its first Symposium.



Edward O. Wilson,

Pellegrino Professor, Emeritus, Harvard University, USA

Edward O. Wilson's career began with the study of the social behaviour of ant populations. He demonstrated that certain aspects of ant behaviour could be triggered by chemical signals, showing that their behaviour was programmed, not learned. He applied these ideas to study the behaviour of other animals, including man, concluding that our genes and our environment intertwine to make us what we are. He has been lauded as one of the founders of the modern environmental movement and is a passionate defender of the need for our human society to seek out means of sustainable interaction with Planet Earth, the only home we have. He has long argued that as human beings multiply and use the Earth's resources to fuel the hedonistic lifestyle practised by the Industrialised countries, the planet's ecosystem is increasingly threatened. Professor Wilson's recent publications make a compelling case that mankind must act rapidly to preserve the Earth's biodiversity for our descendents. Credited with first bringing the concept of biodiversity to mass public attention in 1988, almost 20 years later he continues to encourage society to respond with a greater sense of urgency to the irrefutable evidence that the diversity of life on Earth is in rapid decline. Professor Wilson's many contributions to science have received international recognition. He has received 27 honorary doctoral degrees and more than 70 awards, including the U.S medal of Science (1976), The German Terrestrial Ecology Prize (1987), the French Prix du Institut de la Vie (1990), the Crafoord Prize from the Royal Swedish Academy of Sciences (1990), the Japanese International Prize for Biology (1993), the Franklin Medal of the American Philosophical Society (1999), and the King Faisal International Prize for Science (2000). His conservation work has also been recognised through the award of the Gold medal of the World Wide Fund for Nature and the Audubon Medal of the Audubon Society. His books have also been widely acclaimed and he has twice been awarded the Pulitzer Prize.

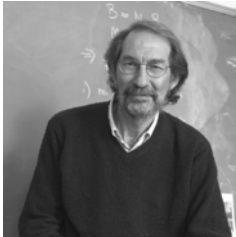


*Courtesy of The
Neurosciences
Institute, La Jolla*

Gerald M. Edelman,

Founding Director of the Neurosciences Institute; President of the Neurosciences Research Foundation; Professor and Chairman of the Department of Neurobiology, Scripps Research Institute, La Jolla, USA.

Prior to embarking on a doctoral degree in science, Gerald Edelman practiced medicine as a Captain in the U.S. Army Medical Corps. He went on to make important contributions to the fields of biophysics, protein biochemistry, immunology, cell biology and neurobiology, throughout a scientific career that now spans six decades. His research achievements have earned him numerous scientific honours as well as popular accolades. He shared the Nobel Prize for Physiology and Medicine in 1972, awarded for his contributions to understanding the structural basis for antibody diversity. Changing his focus of research to developmental biology, in 1975 he was the first to describe the existence of the molecules that glue the developing neurons of the brain's circuitry together. He is also the father of «neural Darwinism», a multidisciplinary theory that combines insights about brain composition, connectivity, structure, function, and evolution. While remaining emphatically opposed to the analogy of the brain as a computer, Professor Edelman has recently made use of computers to model states of human consciousness and conclude that it is an entirely biological phenomenon. He has written a highly accessible account of his alternative to "hard wiring" of the brain's conscious processes in "Bright Air, Brilliant Fire" and is the author of a series of more specialist books that develop a novel theory of human consciousness. Gerald Edelman is not afraid of controversy. He also a master of the art of telling a story and among other things, an accomplished musician. He would probably try to tell you that his myriad skills are not as different from each other as they might appear to be.



Courtesy of The Santa Fe Institute, New Mexiko

Geoffrey West,

President and Distinguished Professor, Santa Fe Institute, New Mexico, USA.

As an undergraduate, Geoffrey West studied mathematics and physics in the 1960's, at Cambridge University in England. He progressed to Ph.D studies in theoretical physics at Stanford University in California and remained based in the U.S. thereafter. He eventually joined the Stanford physics department faculty and later led the particle theory group at Los Alamos National Laboratory. Though he began his academic career and subsequently made his name in the realm of hard-core theoretical particle physics, a long nurtured interest in biology and an unwillingness to acknowledge the operational boundaries between the two domains led him to explore the potential for applying quantitative methods to biological problems such as aging. In the mid-1990s, after a serendipitous encounter with ecologist Jim Brown, the main focus of his interest shifted from particle to biological physics. He began in earnest to study the most complex of all systems: life. Since then, he has made major contributions at the confluence of biology and physics, including seminal work with Brown on biological scaling. The quarter power scaling laws connect a diversity of biological phenomena whose links are not immediately obvious to a non-mathematician. For instance, they relate an organism's size to its metabolic rate and its natural lifespan. West and his collaborators are credited with providing a rational explanation for the rule's universality, based on the idea that life at all scales is sustained by optimised, space-filling fractal networks whose terminal units are invariant. His theory now permits detailed quantitative calculations and predictions of a far broader range of biological phenomena than previously imagined. He is currently engaged in exploring just how far these same rules have predictive value for understanding such complex phenomena as tumour development and social ecosystems. He believes the principals he has elucidated can be harnessed to provide quantitative thermodynamic description of the evolution of conscious thought. As President of the transdisciplinary Santa Fe Institute, Geoffrey West epitomises its goal of exploring the frontiers of knowledge by transcending the usual boundaries. For him, big-picture science can only move forward when researchers allow themselves to ask elementary questions without feeling defensive or vulnerable. In May of 2006, 'Time' magazine cited Geoffrey West in its selection of the world's top sixteen most influential scientists and thinkers of today.



Hans Joachim Schellnhuber,

Founding Director, Potsdam Institute for Climate Impact Research; Professor at Potsdam and Oxford. Universities; Distinguished Science Adviser of the Tyndall Centre for Climate Change Research, UK.

John Schellnhuber trained as a mathematician and physicist, receiving a scholarship for the highly gifted at the University of Regensburg and completing a doctorate in theoretical physics there in 1980. He has made remarkable contributions in the field of climatology, especially regarding the theory of complex non-linear systems and regional and global environmental analysis. He is the author of over 150 articles and books on these subjects His theories predict the emergence of planetary "tipping points" or unstable ecosystems where sudden rapid environmental damage could trigger dramatic knock-on effects to occur on a global scale. As an authority on the analysis and prediction of the impact of changing climatic parameters, he actively serves on many national and international panels for scientific strategies and policy advice regarding environmental and developmental issues. In addition he is a member of the German Advisory Council on Global

Change (WBGU) and chairs the Global Analysis Integration and Modelling (GAIN) Task Force of the International Geosphere-Biosphere Programme (IGBP). Among the many Scientific Honours he has received, he is an elected member of the prestigious Max Planck Society, Leibniz Society the Geological Society of London and the US National Academy of Sciences.



Ian Hacking,

Professor emeritus, Department of Philosophy, University of Toronto; Professeur au Collège de France.

Ian Hacking's doctoral thesis already indicated his love of contrast. To use his own words, he has since then, "dabbled in more fields of thought than you could shake a stick at". A specialist in epistemology, in the philosophy of sciences and in the philosophy of languages, he is an acclaimed writer on subjects ranging from experimental physics to multiple personality. In addition to his many publications in peer-reviewed journals his social commentaries and book reviews such are regularly published in the popular press. His book, *The Taming of Chance* (1990) is a non-fiction, best-seller. He is particularly interested in the different styles of scientific reasoning and in the hierarchical relationships in the arrangement of thought processes. If pressed to give a definition of his own discipline (a word he doesn't underestimate), he chooses the term "analytic philosophy". He claims not to be an interdisciplinarian and never to collaborate with them. The highest academic honours of numerous countries have been bestowed on him. He became the first ever English-speaking member of the Collège de France, where he holds a chair in the philosophy and history of scientific concepts. In 2005, "La Nouvelle Observateur", voted him philosopher of the year. His own role model? Curiosity!



Jean-Pierre Changeux,

Professor, Collège de France; Professor & Chairman of the Department of Neurosciences, Pasteur Institute, Paris.

Courtesy of The Balzan Foundation, Zurich

At the advent of the era of molecular biology, Jean-Pierre Changeux pioneered the study of the role of conformational change in regulatory processes. His PhD studies, carried under the supervision of Jacques Monod, provided the experimental basis for the formal model of allosteric regulatory interactions between bacterial proteins. The model was originally put forward in a paper that has become one of the hundred most quoted papers of the world scientific literature. Throughout a long career, Changeux has consistently built upon and extended his early theory, to spawn many new and flourishing fields of investigation. His main contributions and discoveries in the course of the past 40 years are centered on the general theme of the molecular and cellular mechanisms of signal recognition and transduction, also referred to as receptor mechanisms, primarily in the nervous system. He has never hesitated to combine approaches from supposedly disparate disciplines of pharmacology, molecular biology and developmental biology as well as behavioural and pathological studies, as and when required. His contributions to understanding the regulation of acetylcholine receptors in turn contributed to advancing our understanding of the nature of long term synaptic plasticity within neural networks. They have also inspired a number of other theoreticians and experimentalists. His seminal work on the nicotinic receptor has pioneered new fields of research in signal transduction mechanisms, molecular pharmacology and pathology of chemical communications in the nervous system. The publication of his book *Neuronal Man: The Biology of The Mind* in 1985 brought Changeux celebrity status among the wider public. Since then he has used his obvious talent for communication to co-author several other books directed towards

the non-scientific public. Notably “Conversations on Mind Matter and Mathematics” (1998) and “What Makes Us Think” (2002) are widely acknowledged as having initiated surprising and instructive dialogue between the two often hostile disciplines of neuroscience and philosophy. Jean-Pierre Changeux is the recipient of many prizes, including the Louis Jeantet Prize for Medicine in 1993 and the Balzan Prize in 2001. In April 2006 year he was awarded a Biotechnology Achievement Award from the University of New York School of Medicine in recognition of his career-long contributions to our understanding of the role of conformational changes in regulation of neuronal traffic.



Ofer Bar-Yosef,

Professor of Anthropology and Curator of Paleolithic Archaeology in the Peabody Museum, Harvard, USA.

Ofer Bar-Yosef is one of the world's most renowned experts in Paleolithic (Stone Age) archaeology. The son of native Palestinians whose own parents had emigrated from different parts of the world, his interest in human prehistory was kindled in his most formative years, as were his love of poetry and archaeology. He began formally to study archaeology and geography at the Hebrew University of Jerusalem, obtaining his Ph.D in 1970 and later becoming Professor of Prehistoric Archaeology there. His major work includes the seminal discovery that the Qafzeh hominids were 80,000-100,000 years old, twice the ages that had been previously attributed. His deductive analyses of those findings have shown that mankind is not directly descended from the Neanderthals, who were in fact the contemporaries of our Cro-Magnon ancestors. A wealth of evidence now supports his theory, that technological revolution on a massive scale accompanied the supplanting of our Neanderthal cousins by our Cro-Magnon ancestors. He continues to accumulate that evidence through excavations conducted on prehistoric Levantine sites as well as on Paleolithic and Neolithic sites in China and the Republic of Georgia. Both in the field and in the laboratory, Professor Bar-Yosef has made major contributions to the development of systematic methods for analysis of issues such as the origins of farming communities, the archaeological markers of warfare and the emergence of marked territoriality. He was among the first archeologists to make use of thermoluminescence and electron spin resonance techniques that allow the dating of fossils of such early origin that they are not amenable to radiocarbon dating. His theories and deductive analyses of mankind's prehistorical cultural record are based on every type and combination of evidence that he can acquire. They include climatic clues from sediment layers and studies of regurgitated micromammal remains. In 1988 Professor Bar-Yosef moved to Harvard where he was appointed to his current position as MacCurdy Professor of Prehistoric Archaeology at Harvard University and head of the Peabody Museum's Stone Age laboratory. He has published widely and through his vocation for teaching and his desire to resolve the chronological and geographical gaps in present day records, he has inspired a new generation of researchers who continue to revolutionise the field of archaeology. His own broad experience in pursuing the intellectual challenge of interpreting traces from the past have made him a strong advocate of sharing the lessons that geologists, bioanthropologists, palaeontologists and archaeologists can glean from the same field experience.

Bernard Victorri,

Director of Research, CNRS, Lattice Laboratory, France

Bernard Victorri trained as a mathematician before becoming an internationally renowned authority in the field of linguistics. In 1981 he obtained his Ph.D from the University of Montreal for work on mathematical modelling of the cognitive processes. He was appointed Professor of Mathematics at the Polytechnical School of Montreal while also leading a group conducting research into modelling of neurocognitive processes at the Montreal Institute of Biomedical Engineering. In 1984 he returned to his native France to pursue his research, first at the University of Caen and later as a director of research at the CNRS. He has made major contributions to a wide variety of new fields of study, including semantic modelling, analysis and modelling of acoustic variation (prosody and intonation) and automation of processes such as text translation, information extraction and syntax analysis. His experimental and theoretical studies in modelling of neuropsycholinguistic processes have led him to develop the theory that all modern human languages originated from a single origin. He is also particularly interested in elaborating the role of narrative function in the emergence and structuring of human language. These two ideas, recently expounded in the book "Les origines du langage" (2006) of which he is a co-author, provide the cornerstones of his arguments that the emergence of the narrative faculty has played a more important part in the evolution of modern mankind's social comportment than has the acquisition of a "higher intelligence" *per sae*. Bernard Victorri heads the "Languages, Language and Cognition" team at the Lattice Laboratory, CNRS. (Languages, Texts, Computer Processing, Cognition) since 2000.



Svante Pääbo,

Director, Department of Genetics, Max Planck Institute for Evolutionary Anthropology, Leipzig, Germany

Svante Pääbo first gained public acclaim for reference work on the analysis of DNA from archeological samples. Retrospectively, applying the use of modern DNA amplification techniques to ancient DNA might seem like an obvious way to open windows on our ancestral history and reveal the long hidden secrets of human divergence from the apes. Yet Svante Pääbo was the first person to show that it could be done. His undergraduate education at the University of Uppsala was broad, covering subjects ranging from Egyptology and Russian to molecular virology and medical studies. His doctoral studies, based on his successful isolation of DNA in samples taken from Egyptian mummies in museums, were published in *Nature*. In the 20 years since that ground-breaking study, he has published over 170 papers and used similar techniques to carry out analyses of Neanderthal and Ape genomes. He has worked in Zurich, London, California and Uppsala, and since 1997 directs the multidisciplinary Institute for Evolutionary Anthropology in Leipzig. At the age of 50, is now regarded as the founding father of paleogenetics, the application of genetics to paleontology. Svante Pääbo is currently using comparative genomics, another recent addition to the branching tree of knowledge, to obtain a wide-angle view of species divergence patterns. Research in his laboratory has most recently focused on cross-species comparison of brain-specific gene expression patterns and on the evolution of genes associated with the capacity for human speech. Svante Pääbo has acquired a distinguished record of service on scientific editorial boards and policy-making review committees, but continues to uncover rich new seams of knowledge confluence at a prolific rate. He is the recipient of many academic prizes and honors, including the Louis Jeantet Prize for Medicine, 2005.